

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/649,192	ISLAM ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	John Juba, Jr.	2872	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment of 6/24/04 and interview of 8/6/04.
2. ☒ The allowed claim(s) is/are 1-11, 13-22, 24-38 and 43-70.
3. ☒ The drawings filed on 27 August 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |                                                                                                                                           |                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                               | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)                       |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                      | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date <u>6/24/2004</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                               |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material                                | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance                         |
|                                                                                                                                           | 9. <input type="checkbox"/> Other _____.                                                          |

***Examiner's Amendment***

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Brian Gaffney and Dr. Mohammed Islam on August 6, 2004. The change to claim 11 corrects an artifact of document scanning that was present in the Official submission, but not the examiner's courtesy copy of the claims.

**In the Claims:**

Claims 1 – 10, 13 – 22, 24 – 38, 44 – 56, and 58 – 70 read as presented in Applicants' amendment of June 24, 2004.

Claims 12, 23, and 39 – 42 are canceled.

Claims 11, 43, and 57 now read as shown in the pages attached separately herewith.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Knipe (U.S. Appl. Pub. no. 2002/0093721 A1) discloses an array 16  $\mu\text{m}$  square reflectors outward of an inner conductive layer and operable to undergo partial rotation, suggests that a plurality of such arrays can be used with source of colored light beams, and teaches that the mirrors can be rotated in an analog fashion.

Anderson, et al (U.S. Patent number 6,208,318) discloses a plurality optical signal processing devices (Col. 5, lines 30 – 40) arranged with a light source and color separator (Fig. 2c), wherein the processing devices are operable in analog fashion ("non-digitally"; Col. 5, line 46; Col. 6, lines 49 –60) under the influence of controllers which control the angle of rotation and thus the intensity of reflected light (Col. 10, lines 39 – 46).

Nelson, et al (U.S. Patent number 6,163,363) disclose a digital photograph printer comprising a single DMD array logically divided into regions corresponding to a different color, the regions illuminated with a sequential color filter or a set of fixed color filters, and disclose that analog operation is possible.

Broddin, et al (U.S. Patent number 6,011,631) disclose a printing apparatus having an array of 17  $\mu\text{m}$  square mirror elements.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Post-allowance papers should be mailed to **Box Issue Fee**. Post-allowance papers may also be faxed to correspondence branch in PUBs. The fax number is (703) 308-5083. The **PUBs customer service** number is (703) 305-8497.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (571) 272-2314. The examiner can normally be reached on Mon.-Fri. 9 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Drew Dunn whose number is (571) 272-2312 and who can be reached on Mon.- Thu., 9 - 5.

  
JOHN JUBA, JR.  
PRIMARY EXAMINER  
Art Unit 2872

August 6, 2004

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Selected Claims (8/6/2004)

11. (Currently Amended) An optical processing device, comprising:

an optical signal separator operable to direct a portion of an unmodulated optical signal for modulation;

an array of variable blazed gratings located on one or more semiconductor substrates, the array of variable blazed gratings operable to receive the portion of the unmodulated optical signal and to modulate that signal based at least in part on a control signal received from a controller; and

a delay line operable to receive at least another [p rtion] portion of the unmodulated optical signal and to delay transmission of that signal portion until the portion of the unmodulated optical signal has been processed.

43. (Currently Amended) A light processing system, comprising:

an optical signal separator operable to direct a portion of an unmodulated optical signal for modulation; and

an array of optical signal processing devices located on one or more semiconductor substrates, the array of optical signal processing devices operable to receive the portion of unmodulated optical signal and to modulate that signal based at least in part on a control signal received from a controller;

wherein at least some of the optical signal processing devices comprise:

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an inner conductive layer comprising an at least substantially conductive material and a plurality of electrically coupled first conductors; and

a plurality of at least partially reflective mirrors disposed outwardly from the inner conductive layer and operable to receive at least a portion of the unmodulated optical signal, wherein none of the plurality of mirrors has a width greater than 40 microns and wherein at least some of the mirrors are operable to undergo a partial rotation in response to the control signal, the partial rotation resulting in a reflection of the unmodulated optical signal wherein a majority of the reflected optical signal is communicated in one direction;

wherein each of the plurality of electrically coupled first conductors is associated with a separate one of at least some of the plurality of at least partially reflective mirrors and disposed approximately inwardly from a first edge of the associated mirror; and

wherein each of the plurality of electrically coupled first conductors is connected to the same drive source; and

wherein the control signal comprises a voltage operable to create one of a plurality of selectable non-zero voltage differentials between the inner conductive layer and at least the first edges of the associated mirrors to create an electrostatic force tending to rotate the first edges of the mirrors toward the associated first conductor resulting in one of a plurality of selectable angles of rotation of the mirrors.

57. (Currently Amended) A light processing system operable to receive and process one or more optical signals, the light processing system comprising:

an optical signal separator operable to direct a portion of an optical signal for processing; and

an array of optical signal processing devices located on one or more semiconductor substrates, the array of optical signal processing devices operable to perform an optical signal processing operation on at least the portion of the optical signal; and

an electronic processor coupled to the array of optical signal processing devices, the electronic processor operable to perform a processing operation on at least some of the portion of the optical signal;

wherein at least some of the optical signal processing devices comprise:

an inner conductive layer comprising an at least substantially conductive material and a plurality of electrically coupled first conductors; and


a plurality of at least partially reflective mirrors disposed outwardly from the inner conductive layer and operable to receive at least a portion of the optical signal, wherein none of the plurality of mirrors has a width greater than 40 microns and wherein at least some of the mirrors are operable to undergo a partial rotation in response to one or more control signals, the partial rotation resulting in a reflection of the at least some of the portion of the optical signal wherein a majority of the reflected optical signal is communicated in one direction;

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wherein each of the plurality of electrically coupled first conductors is associated with a separate one of at least some of the plurality of at least partially reflective mirrors and disposed approximately inwardly from a first edge of the associated mirror; and

wherein each of the plurality of electrically coupled first conductors is connected to the same drive source; and

wherein the one or more control signals comprise a voltage operable to create one of a plurality of selectable non-zero voltage differentials between the inner conductive layer and at least the first edges of the associated mirrors to create an electrostatic force tending to rotate the first edges of the mirrors toward the associated first conductor resulting in one of a plurality of selectable angles of rotation of the mirrors.

  
JOHN JUBA, JR.  
PRIMARY EXAMINER